Distr.
LIMITED

IPCT.92
24 October 1989

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

INTEGRATED CIRCUITS

Trends in Intellectual Property Protection*

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* The views expressed in this document are those of the author and do not necessarily reflect the views of the Secretariat of UNIDO. This document has not been edited.

V.89-60686

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1. Introduction

The issue of the legal protection of integrated circuits' lay-out designs has only emerged in the last ten years, during which time a hard -fought battle for the domination of an expanding world market has taken place. While that market represented, in 1987, around US$ 30 billion (for semiconductors), what is really at stake in that battle transcends the sector's economic dimension. The industry of semiconductors is a leading sector because of its widespread economic impact on users and suppliers, and because of the broad research and development activities it involves in fields such as physics, chemistry and materials technology. Leaving aside national defense interests, it is strategic for competing in computers, telecommunications, consumer electronics and other segments of the growing market of semiconductor-based products which today is worth, roughly, US$ 500 billion (Borrus, 1988, p. 37-39). For some analysts, moreover, "the chip war is ultimately a worldwide struggle for the dominance of an industry and technology that may well determine the geopolitical and economic leadership of the twenty-first century" (Warshofsky, 1989, p. 16).

The current efforts to establish an international system for the protection of the semiconductors' lay-out designs, mainly prompted by the initiative of the United States, reflects, on the one side, the present competitive struggle between the main actors in the field (basically large U.S. and Japanese firms) and, on the other, the profound world asymmetry as regards productive and technological capabilities for the manufacture of semiconductors. United States and Japan control around 90% of the world production. Other developed countries have entered the field, but, until now, with very limited results. A few developing countries -most notably the Republic of Korea- have also attempted to introduce themselves into the area.

This paper reviews the steps taken at the national and international level in order to strengthen the suitability of design-related innovations in the area of semiconductors. It briefly considers, in section two, U.S. legislation on the matter, which has helped to determine the speed and direction of the developments in this field. Section three contains a brief description of the negotiations undertaken in order to establish an international convention on intellectual property concerning integrated circuits, and examines the main provisions of the treaty adopted in May 1989. Section four contains some considerations on the likely impact of the said treaty and the main conclusions of the study.

2. National regulations

2.1. The U.S. Semiconductor Chip Protection Act

The majority of developed countries have already enacted specific legislation, or are in the process of doing so for the protection of lay-out designs of integrated circuits. The diffusion of such a legislation, on the basis of a sui generis approach, is a noticeable case of rapid internationalization of standards developed at the national level in order to satisfy the demands of a competitive domestic industry.

The United States was the first country to adopt, in November 1984, a special law for the protection of "mask works" (the "Semiconductor Chips Protection Act"-SCPA). The SCPA was the outcome of a five year - long debate prompted by the American semiconductor industry. A major concern of that industry, and one of the main objectives of the law, was to prevent a supposedly growing chip piracy, mainly originating in Japan, that could undermine the unquestionable supremacy -at that time- of U.S. firms in that field.

The debate of the draft law was a matter of substantial controversy between the Senate and the House of Representatives in establishing the form of protection to be granted. The Judiciary Committee of the U.S. Senate "favoured an amendment to the Copyright Act, on the basis that the Act was already used to cover a variety of highly functional items. The Senate also believed that the use of the copyright law would protect chips with certainty and stability. Any new statute has potential hazards as new concepts and terms often require judicial interpretation before they can be applied with certainty. In the opinion of the Senate committee, the Copyright Act could have been amended without any realistic threat to the integrity or efficacy of existing copyrights or future copyrights in the kinds of works for which copyright protection is already available. The Judiciary Committee of the House of Representatives took the opposite view. They believed that semiconductor chips are completely functional, having no copyrightable expression apart from their functional characteristics, and as such may present a different class of articles. The House committee noted that if the Copyright Act were to be amended it would give rise to a substantial inconsistency. Chips, which have no copyrightable expression and are completely functional, would be protected, while other articles which have both an expression and functional attributes, but in which the two cannot be separated, would not be protected" (Fitzsimons, 1987, p. 16).

Among the most conflicting issues, the debates highlighted the problem of applicability of the "fair use" doctrine and the compliance with national treatment obligations under the Universal Copyright Convention. Publishers were strongly opposed to any extension of the "fair use" concept to cover the practice of reverse engineering while, on its part, the U.S. semiconductor industry considered it unacceptable to confer protection in the United States to designs originating in countries where no substantial protection was granted (Fort, 1987, p.28).

The SCPA introduced a special title of legal protection for "mask works[1]" fixed in a semiconductor chip product. As shown below, the regulations adopted later on in other countries, as well as the WIPO Treaty, avoided the use of the "mask work" terminology, in view of the technological changes occurring in the fields of semiconductors' design and manufacture.

As under copyright, the SCPA made protection conditional upon the originality of the work. According to Section 902 (b) (2) of the U.S. Law, protection is not available for a "mask work" that is not original or consists of designs that are basic, commonplace, or familiar in the semiconductor industry, or has variations of such designs, combined in a way that, considered as a whole, is not original.

Under Section 904 (a) of the U.S. Law, protection of a mask work commences on the date of first commercial exploitation (unless it is preceded by registration under the US Law). In order to maintain protection, registration must be effected within two years from the first commercial exploitation (Section 908 (a)). Where first commercial exploitation precedes the registration, the protection ends, according to Section 904 (b) and (c), at the end of the tenth calendar year from the first commercial exploitation.

Section 901 (a) (5) of the referred Act defined "commercially exploitation" to mean the distribution to the public for commercial purposes of a semiconductor chip product embodying the mask work, with the proviso that such term includes an offer to sell or transfer a semiconductor chip product only when the offer is in writing and occurs after the mask work is fixed in the semiconductor chip product.

The SCPA also included specific rules on the registration of a mask work. According to Section 908 (a), its owner may apply to the Register of Copyrights for registration of a claim of protection. Such a registration is a prerequisite for maintaining the protection since Section 908 (a), second sentence, states that protection of a mask work terminates if application for registration is not made within two years after the date on which the mask work is first commercially exploited anywhere in the world.

Under U.S. law the certificate of registration constitutes prima facie evidence of the facts stated in the certificate (Section 908 (f)). "Thus, registration, in essence, amounts to a reversal of the burden of proof in an infringement action resulting in the defendant having to prove that the registered mask work does not deserve protection. Moreover, according to Section 910 (b), registration is required in order to institute a civil action for infringement" (WIPO f, 1988, Study 6, p. 12).

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1 According to section 901 (a) "Mask work" is a series of related images, however, fixed or encoded:
(A) having or representing the predetermined, three-dimensional pattern of metallic, insulating, or semiconductor material present or removed from the layers of a semiconductor chip product; and
(B) in which series the relation of the images to one another is that each image has the pattern of the surface of one form of the semiconductor chip product.

The Regulations issued by the Register of Copyrights in 1985 determined the information to be submitted in order to obtain registration. Among other relevant rules, it is interesting to note that they permitted the title-holder to retain trade-secrets. The treatment of the information for which a trade-secret is claimed depends, according to Section 211.5 (c) of said Regulations, upon whether or not the mask work has been commercially exploited prior to the time of the application to register the claim to the design[2].

An important provision of the law (section 906) refers to the exception of "reverse engineering". The law does not consider it an infringement for a person to reproduce the mask work solely for the purpose of teaching, analysing or evaluating the concepts or techniques embodied in it or the circuitry, logic flow or organization of components used in it, or to perform the analysis or evaluation mentioned above to incorporate the results in an original mask work which is made to be distributed. With this provision, "competitors may not only study protected mask works, but may use the results of that study to design, distribute and import semiconductor chip products embodying their own original mask works" (Greguras et al, 1985, p.61)[3].

Another particularly relevant provision relates to the immunity for innocent purchasers of pirated chips. In accordance with section 907, an innocent purchaser of an infringing semiconductor chip product:

is not liable for merely using the chip product;

is not liable for the importation or distribution of the infringing product that occurs before the innocent purchaser has had notice of protection with respect to the mask work embodied in the product; and

is liable only for a reasonable royalty on each unit of the infringing semiconductor chip product purchased prior to notice and imported or distributed after having such notice. The amount of the royalty will be determined in a civil action for infringement unless the parties resolve the issue by voluntary negotiation, mediation or binding arbitration.

A provision which has been of particular importance for the rapid adoption of a sui generis regime for integrated circuits in developed countries, concerns the treatment of mask works belonging to foreigners. Section 914 established a well defined system of strict material reciprocity, i.e. protection in the United States was made conditional upon similar protection in the country of the foreign applicant.

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2 For the detailed regulations on this issue see WIPO f, 1988, Study 6, p.13.

3 The House report stated that the intent of the reverse engineering exception was "to permit ... tge "unauthorized" creation of a second mask work whose layout, in substantial part, is similar to the layout of the protected mask work - if the second mask work was the product of substantial study and analysis, and not the mere result of plagiarism accomplished without such study and analysis" (quoted by Greguras el al, 1985, p.62).

Under the Act, the Secretary of Commerce may extend interim protection to nationals of foreign nations under certain conditions: (1) that the foreign nation in question is making progress (either by treaty negotiation or legislative enactment) towards a scheme of protection similar to that under the Act; (2) that its nationals and persons controlled by them are not engaged in misappropriation or the unauthorized distribution or commercial exploitation of mask works; and (3) that entry of the Secretary's order would promote the purpose of the Act and of achieving international comity toward mask work protection[4]. A system of presidential declaration was also made available under the SCPA[5].

The SCPA, Finally, authorised the title-holder of a mask work to affix notice (either the word "mask work", the symbol *M* or the letter M in a circle) to masks and semiconductor chip products embodying the mask work, which has the consequence of a prima facie evidence of a "notice of protection".

2.2 Impact of the SCPA

While the congressional discussion was taking place, the superiority of U.S. firms in the semiconductors' world market was being seriously undermined. In 1975 the U.S share of that market was virtually 100 percent. In 1984, at the time when the SCPA was approved, that participation had fallen to about 60%. It was further reduced to 42% in 1988, when already six out of the ten major open-market producers of semiconductors were Japanese. "What is even more disturbing is that in the new generation of chips, the 1-megabit DRAMs, for example, the United States has only 5 percent of the market, a market that will grow significantly in the future as more and more systems are designed to take advantage of the greater memory capacity" (Warshofsky, 1989, p.12).

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4 By the end of October 1985 the Patent and Trademark Office had received petitions from fourteen countries seeking protection of their semiconductor chip designs in the United States. Since the fourteen countries accounted for nearly all of the foreign semiconductor production, that Office did not expect any additional petition to take place (Carmichael, 1987, p.436).

5 According to section 902 (2) whenever the President finds that a foreign nation extends, to mask works of owners who are nationals or domiciliaries of the United States protection (A) on substantially the same basis as that on which the foreign nation extends protection to mask works of its own nationals and domiciliaries and mask works first commercially exploited in that nation, of (B) on substantially the same basis as provided by U.S. law, the President may by proclamation extend protection to mask works (i) of owners who are, on the date on which the mask works are registered or on the date on which the mask works are first commercially exploited anywhere in the world, whichever occurs first, nationals, domiciliaries, or sovereign authorities of that nation, or (ii) which are first commercially exploited in that nation. Until September 1988, no presidential proclamation had been issued (Laurie, 1988, p.17)

The decline of U.S. leadership in semiconductors cannot be attributed to the copying of American designs and technology. Japanese firms excel in the manufacturing of products at low cost with high quality. They beat U.S. firms mainly in manufacturing technologies, but also made important progress in product technology. From 1975 to 1982 the U.S. share of world patenting on integrated circuits fell from 43% to 27%, while that of Japan rose from 18% to 48%. Today, Japanese firms have a technological lead in most areas of semiconductors manufacture[6] and, what is of crucial importance, they have also dramatically progressed in the field of production equipment: "Over the past decade, the Japanese equipment industry's world market share has more than doubled to over 30 percent, primarily at the expense of U.S. firms. Moreover, Japanese suppliers have reached parity or even superiority in major technologies, including packaging, automated assembly equipment, various ultrapure materials, some categories of fabrication equipment and specialized procedures such as mask making" (Ferguson, 1987)[7].

Between 1985 and 1987 (September) the U.S. Copyright Office received 3.401 applications under the SCPA, and made 3.003 registrations. The majority of these correspond to U.S. firms (see table 1).

Table 1 Registration of lay-out designs of integrated circuits lay-out in United States*

		1985	1986	1987(*)	Total
Total of applications		1.880	542	978	3.401
Total of registrations		1.263	859	881	3.003
Country of origin	United States	717	620	466	1.803
	Japan	481	179	380	1.040
	United Kingdom	39	20	30	89
	Netherlands	10	0	0	10
	Sweden	6	10	0	16
	Canada	5	18	1	24
	France	2	5	1	8
	F.R.G.	2	2	0	4
	Italy	1	0	2	3
	Ireland	0	4	0	4
	Australia	0	0	1	1
	Finland	0	1	0	1

Source: U.S. Copyright Office.

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6 Significant Japanese advances have been recently reported in microprocessors, an area deemed to be the technological bastion of U.S. strength in computer components. See Chapman Wood, 1989, p.12.

7 Japan's makers of production equipment obtained solid market gains in 1988. Tokyo Electron leaped from the N° 6 slot in 1987 to N° 2 behind first-place Nikon Corpn. and Canon Inc. moved N° 6 from N° 7. Just 10 years ago, the best that any Japanese company could manage was 15th. Business Week, 1989.

* Situation as of 30 September 1987.

The SCPA was one of the measures promoted by the U.S. industry to curb its gradual decline in world markets. As mentioned before, it was premised on the assumption of an important piracy activity, mainly by Japanese firms. However, as indicated by an American authority, "the perceived evil of chip piracy in the form of slavish copying, as portrayed during the legislative hearings, does not really exist. The pirate must copy exactly because, without an understanding of the circuitry, the smallest change in the topography could be fatal to the operability of the chip. The problem with this scenario is that, with a high level of integration (e.g. LSI or VLSI) in order to go from chip number 1 to photographs to magnetic tape to masks to chip number 2, the fabrication processes for chips 1 and 2 have to be virtually identical. Because such processes were highly proprietary to each chip developer, it was not likely that a pirate could duplicate them. Upon close examination, the few specific instances of chip piracy cited during the legislative hearings either involved relatively low density, highly repetitive designs such as 16K static RAM memory chips or were, in fact, examples of reverse engineering" (Laurie, 1988, p.35/37).

The litigation under the SCPA has been, in fact, almost nonexistent. The only case brought to the courts involved two American firms, Brooktree Corp. and Advanced Micro Devices Inc.. The plaintiff claimed that Advanced Micro Devices had copied two of the former's chips that represented 40% of its sales. The Court (Southern District of Carolina) found that the defendant presented evidence of a paper trail showing the various stages of the design process. It recalled that the SCPA does not prohibit independent development of a mask work, and that "an identical but original second mask work is not an infringement of the first". It also held, on the basis of section 906 of the law, "that the Mask Work Act was directed at minimal investment piracy rather than at the type of long-term research and reverse engineering it (the defendant) performed"[8].

In view of the little judicial activity under the SCPA, Siegle and Laurie may be right in sustaining that the law still is "a solution in search of a problem" (Siegel and Laurie, 1989, p.14). Although continuing technical progress may eventually make copying easier in the future, undeniably the protective régime has not helped either to encourage innovation in U.S. industry or to prevent the rise of Japan as a strong competitor.

Certainly, the SCPA was not the only measure devised by the U.S government for that purpose. In 1986 it concluded a "chip pact" with Japan trying, among other things, to monitor and maintain above certain levels chips' export prices. The Ministry of International Trade and Industry's (MITI) agreed to issue an administrative guidance to companies not to export semiconductors below cost; requiring semiconductor exporters to report export price data to the government; the systematic monitoring of export prices and production costs; and indirect quantitative production controls through supply-demand forecasts[9].

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8 The decision denied the plaintiff's motion for a preliminary injunction: (Civil No. 88-1750-E (CM), 13-12-88).
9 The Gatt Council found that guidance to be in violation of the GATT agreement (The Japan Economic Journal, 1988, p.22).

On the other hand, a joint industry-government-funded consortium (the Semiconductor Manufacturing Technology Institute-SEMATECH) was established in 1987 in order to develop a new generation of manufacturing technologies and, in particular, to improve the capabilities in the field of equipment for the production of semiconductors. SEMATECH received contributions from IBM, ATT and other large firms, including in terms of designs, masks and test data bases of advanced chips (such as the 4-megabit DRAM of IBM) (Warshofsky, 1989, p. 367..The Defence Department decided to contribute as much as US$ 600 million over six years to support SEMATECH activities.

Finally, the 1988 amendment to the Trade Bill included the setting up of a National Advisory Committee on Semiconductors, with the main function of recommending the allocation of R&D funds and preventing duplication of effort in federal laboratories and academic institutions.

2.3. Legislation in other industrialised countries

Notwithstanding the feeble impact of the SCPA on the overall performance of the United States in the semiconductors field, the Act had a considerable influence on other developed countries' legislation. Certainly, the stringent reciprocity clause of the SCPA constitutes a major factor explaining the rapid adoption of the new sui generis approach by many countries. The special chips legislation had no precedent in those countries. In some of them -such as in United Kingdom, Holland, Canada[10], Australia[11] - lay-out designs were deemed to be protectable under copyright[12]. In other countries, unfair competition was considered applicable[13].

The first country to react to the U.S. law was, not surprisingly, Japan. In May 1985, "the Act concerning the circuit lay-out of a semiconductor integrated circuit" (law No 43) was promulgated. The Japanese law is modelled on the SCPA. A number of differences can, however, be identified.

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10 The Government of Canada announced in February 1986 that mask works fixed in semiconductor chips would be protected by the Copyright Act but that such works would be distinguished from traditional works (WIPOb, 1986, para. 39).

11 In Australia chips lay-out designs were considered artistic works. See Fitzsimons, 1987, p. 18.

12 After the enactment of the SCPA copyright may also be applied in the United States to lay-out designs which have not been fixed or which have not complied with some conditions for protection. See Laurie, 1988.

13 Article 5 of the Swiss revised law on Protection Against Unfair Competition (1986), entitled "Exploitation of the Achievement of Somebody Else", provides in Section (c) an act of unfair competition is committed by a person who, by means of technical processes of reproduction and without corresponding sacrifices, takes over the results of the work of somebody else which are ready to be put on the market and exploits them as such.

First, the Japanese law defined the "circuit layout" of a semiconductor integrated circuit, and not the "mask work" as the subject matter of protection. It thus avoided a reference to a concept linked to a technology prevailing at the time the SCPA was drafted, but focussed on the process of being substituted by other methods (use of an electron beam under the control of a computer) that do not require the use of a mask. Second, the conditions for protection of a lay-out (originality, non-commonplace, etc) are not spelled out. There must be just a "creation". Third, law 43 did not establish reciprocity requirements based on the nationality or domicile of the applicant. Fourth, the Japanese law made protection conditional upon the registration of the lay-out, which should be effected within two years of its first commercial exploitation. Fifth, according to one interpretation, the "reverse engineering" exception would be more restrictive than under U.S. law, for it would not permit copying from a first chip into a second reverse engineered chip (Kitagawa, 1986). Finally, under Japanese law infringement may result in criminal punishment.

A significant number of applications under the Japanese law were effected immediately after its enactment. In November 1987, 1353 lay-outs had been registered (see table 2). While in the case of the registration in the United States, Japanese firms held, 31% of total applications (see table 1), U.S. firms only accounted for 12% of applications made in Japan. The majority of registrations made in Japan corresponded, on the other hand, to bipolar (47%) and MOS (48%) integrated circuits (see table 3).

Table 2 Registration of lay-out design of integrated circuits in Japan*

		1986	1987*	Total
Total of applications		840	513	1.353
Total of registrations		838	510	1.348
Country of origin	Japan	748	416	1.164
	United States	78	87	165
	Netherlands	10	0	10
	United Kingdom	3	6	9
	F.R.G.	0	4	4
	France	1	0	1

Source: Industrial property Cooperation Center

(*) Situation as of 30 November 1987.

Table 3 Applications by type of lay-out designs of integrated circuits in Japan (1986)

Bipolar	391	47%
MOS	406	48%
Bi-MOS	27	3%
Other	16	2%
Total	840	100%

Source: Industrial Property Cooperation Center.

In December 1986, Sweden approved a law on lay-out designs of integrated circuits (N° 1425). Unlike the U.S. and Japanese precedents, no registration system was established. Protection is granted from the creation stage (no fixation is required), but it lasts for ten years after the first commercial exploitation of the lay-out design. Almost simultaneously, the Council of the European Communities approved a Directive "on the legal protection of topographies of semiconductor products" (87/54/EEC).

One important innovative feature of the EEC Directive was the adoption of a new terminology ("topography") to define the subject matter of protection[14], that has been subsequently applied in the relevant European laws. The Directive required the existence of "an intellectual effort" (and not "originality") for protection. It authorised Member States to establish registration as a condition for protection and to require the presentation of material identifying or exemplifying the topography (which should not be made available to the public, however, where it is a "trade secret"). The provision on "reverse engineering" presented some differences in relation to the U.S. model and to the Japanese law (Hart, 1987, p. 5). Further, the EEC Directive included a provision on non-voluntary licenses, which states the cases in which the Member States cannot grant them, i. e. "for the sole reason that a certain period of time has elapsed, automatically, and by operation of law" (art. 6). This broad provision has permitted a Member State -Spain- to establish in its national law the possibility to grant non-voluntary licenses for reasons of "public-interest" (article 6, law of May 1988).

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14 According to article 1 of the Directive, the "topography" of a semiconductor product shall mean a series of related images, however fixed or encoded.
(i) representing the three-demensional pattern of the layers of which a semiconductor product is composed; and
(ii) in which series, each image has the pattern or part of the pattern of a surface of the semiconductor product at any stage of its manufacture.

A number of other countries adopted thereafter sui generis laws to protect semiconductor lay-out designs. These included United Kingdom, Federal Republic of Germany, France, Netherlands, Denmark, Spain, Austria, Australia and Italy[15]. Notwithstanding some differences, they all followed the approach inaugurated by the SCPA and conferred a ten-year term protection under comparable conditions. To a great extent, hence, the United States had succeeded in translating its national law into an international standard, at least in most developed countries.

The integrated circuits protection, as suggested before, is a remarkable example in the development of international economic law. It shows how technological and political power may determine the shape and extent of regulations in a given area, for a very specific issue and on the basis of almost completely new standards. As warned by the delegation of the Federal Republic of Germany at one of the sessions of the Committee of Experts convened by WIPO, there is a risk "of creating separate systems of sui generis protection for all new technologies"[16]. A matter of concern, also, is the "regression to the old reciprocity principle which historically had already been abandoned and replaced by the national treatment regime of the world-wide intellectual property treaties (Cohen Jehoram, 1987), as a means to shape international norms of protection."

As indicated in the next section, the process of internationalization of the sui generis regime for semiconductors further manifested itself in the work expeditiously undertaken by WIPO in order to establish an international treaty on the matter. While that work was progressing, United States and Japan submitted proposals for discussing the same matter in the framework of GATT negotiations on intellectual property rights (Correa, 1989).

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15 Draft laws have also been reported in Switzerland and Norway.
16 The German expert also "questioned whether it would not be advisable to create a system of protection on a wider level, similar to the protection against unfair competition, prohibiting the unlawful appropriation of the works of others" (WIPOa, 1985).

3. The WIPO Treaty on intellectual property in respect of integrated circuits

3.1 The Negotiations

Soon after the adoption of the SCPA, the Secretariat of WIPO eatablished the grounds for the discussion of an eventual international convention on the matter, based on the concept of a sui generis protection. In 1985, a first draft treaty was prepared and circulated, and a Committee of Experts on the matter was held in November of that year. At the outset, developing countries were reluctant to discuss the establishment of a new treaty on the matter. The main questions raised dealt with the economic and legal justification for such a convention, as well as the form that the protection should adopt. Developed countries, on their part, welcomed the WIPO initiative. In particular, the delegation of the United States called attention "to the need for integrated circuit protection so as not to hinder progress in integrated circuit technology, and was of the view that there should be an international commitment to recognize and respect the property rights in original layouts or designs of integrated circuits under appropriate conditions" (WIPO a, 1985).

Four meetings of Experts were held between 1985 and 1998 in order to consider the draft treaty. In addition, WIPO convened two consultative meetings of experts of developing countries[17] and prepared a set of studies "dealing with legal matters" concerning intellectual property in respect of integrated circuits[18].

The criticism of developing countries[19] mainly concerned the lack of justification for the establishment of an international treaty on the basis of a special protection for lay-out design of integrated circuits, as well as on specific aspects of the draft proposed by WIPO Secretariat. The absence of sufficient and convincing reasons for developing countries to legislate on the matter was emphasised by many developing countries (WIPO c, 1988, p.3). India indicated, in particular, that the draft treaty did not provide a well-balanced solution, since it did not adequately address and protect the interests of all parties concerned, especially the interests of the developing countries (WIPO, 1988c, p.2). The Mexican delegation, on its part, argued that it was not clear that the introduction of a sui generis treaty was the best option, and that rather than affording protection, it should promote technology transfer.

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17 Experts from seven developing countries - Argentina, Brazil, China, Egypt, Ghana, India and Indonesia-participated in such consultations.
18 Developing countries requested at the Third Session of the Group of Experts studies on a number of issues, including economics of production of integrated circuits, technological aspects, transfer of technology, rationale for protection and specific legal problems. See WIPOc, 1987.
19 The analysis that follows is partially based on the author's paper "Intellectual property in the field of integrated circuits. Implications for developing countries". prepared for the Development Center (OECD), May 1989

"At present", the expert said, "the semiconductor industry was concentrated almost entirely in developed countries, and the protection of its creations benefited them exclusively. The budding electronics industry of developing countries was mainly engaged in the assembly of equipment and systems, and was still heavily dependent on components such as circuits that were designed and manufactured by a few transnational corporations. Against this background it was not easy to accept that there should be a desire to strengthen still more the position of the manufacturers of integrated circuits by means of a treaty that covered not only the copying of the designs but also the marketing of the circuits and articles that contained copied designs" (WIPO c, 1988, p. 8-9).

The type of protection to be granted has also been the subject matter of considerable discussion. Argentina held that unfair competition would be the most appropriate way to cover the issue, under the terms of article 10 bis of the Paris Convention. Brazil and South Korea suggested that utility models or industrial designs legislation could be appropriate. For India, integrated circuit lay-outs are a copyrightable matter and that country formally submitted a draft codicil to the Berne Convention.

Several developing countries pointed out imbalances of the proposed international treaty. Argentina stressed "the serious imbalance existing between the type of protection that was being proposed and the low standards that had to be met for the design of an integrated circuit to be elegible for protection" (WIPO c, 1988, p.4). The expert from the Republic of Korea stated that the sui generis approach favoured the interest of proprietors, and was less favourable for the general public: "since the proprietors of rights in respect of layout-designs would mainly be large companies in industrialized countries, laws for the protection of layout-designs must also guarantee the interests of the general public against abuse of rights. Thus, the possibility of compulsory licenses must be introduced into a sui generis law for the protection of layout-designs. In addition, he emphasised the difficulty of reverse engineering for enterprises in developing countries, owing to inadequate equipment and technology, so that the protection granted to a proprietor must be balanced by a requirement of clear disclosure to the general public of the subject matter and the scope of protection" (WIPO c, 1988, p.15).

While contesting the rationale of the protection and the approach adopted, developing countries participating in WIPO negotiations also questioned specific aspects of the proposed treaty, which closely follows United States and other industrialized countries' legislation. Among other points of concern, several countries stressed the need to provide for non-voluntary licenses. According to an expert from India "the possibility of reverse engineering under the draft treaty was not a sufficient reason to deny non-voluntary licensing because, reverse engineering was only possible by large companies and needed large investments and adequate infrastructure, which would put such efforts in the developing country environment at a disadvantage" (WIPO a, 1988, p.2/3). A system of non-voluntary licenses may be particularly important to satisfy public interests (e.g. in the area of safety, defence or health) and to avoid abuses by the title-holder in cases where there are no capabilities in the country to undertake an independent development or to reverse engineer a protected lay-out design.

One of the most criticised points related to the extension of the protection to chips incorporated in industrial articles. Given the pervasiveness of microelectronics, it becomes in effect extremely difficult, particularly for developing countries, to investigate and determine whether the chips incorporated in various types of products are original or not. While some developing countries denied the existence of a right of the design owner in such a situation, others argued that though the protection does not terminate with the incorporation of a chip into a broader product, a different (more restricted) legal action on the commercialization of the latter should be granted.

Provisions on innocent infringement were also highly controversial, particularly as they could relate to the products that incorporate chips. According to an expert from Mexico, innocent third parties "should be indemnified by the persons who copied the designs, rather than being obliged to pay compensation as was being provided in the draft Treaty. The expert considered that third parties should be exempted from liability under the Treaty, and not only those who purchased the actual integrated circuits. The user should not be affected; the seller, not the purchaser, should be penalized" (WIPO c, 1988, p.22). In addition, it was argued, a letter by the design title-holder notifying an infraction could "block a whole series of commercial acts that third parties might be engaging in. On the other hand, the same letter could rely on exclusive entitlement to an integrated circuit that had been granted pursuant to the provision on confidentiality. The result would be that the supposed infringer would not be able to find out anything about the protected subject matter, even by approaching the industrial property offices that had granted the title of protection" (WIPO c, 1988, p.23).

The limitations on disclosure and the eventual creation by the WIPO draft treaty of a multilateral system of trade secrets protection, were consistently opposed by several developing countries. The expert from the Republic of Korea, for instance, proposed that the contents of the layout-design should be disclosed to the general public in a gazette "particularly, a short description of the lay-out design and claims should be contained in the application and be filed with the registration office" (WIPO c, 1988, p.15). The lack of full disclosure was also criticised by Brazil, as constituting one of the far-reaching conceptual changes in intellectual property title and one of the factors determining the lack of balance between the rights and obligations emerging from the proposed system (WIPO c, 1988, p.8).

Finally, a maximum of 5-7 years duration for a title on chips' design was sustained by most developing countries. In accordance with the expert from China "the duration of protection for layout-designs of integrated circuits, should be less than the life-time of the technology, since the owner of the right in the technology should be entitled to profit from his investment during the early part of the life of the technology, while society as a whole should profit from the technology during the latter stage of the technology's life" (WIPO c, 1988, p.12).

In sum, at the time the Diplomatic Conference for establishing a treaty on the matter was convened, considerable doubts and hesitation prevailed among developing countries. None of these countries had legislated on the matter and have not yet done so. For most of them, moreover, the issue of integrated circuits protection was not only new but was not among the areas of immediate concern in the field of industrial development or trade policies.

On the other hand, after the preparatory work was carried out under WIPO auspices, the views of developed countries on the content of a future treaty seemed to be considerably harmonised. In fact, no substantial differences were perceived during discussions of the Committee of Experts' discussions, except for a few matters in which final common positions were not reached. Clearly, those countries unanimously favoured the adoption of an international convention on the matter.

3.2. Scope and content of the Treaty[20].

The Diplomatic Conference convened in Washington from May 8 to 26, 1989, and approved with 49 votes the text of an international convention, based on the draft prepared by the WIPO Secretariat (WIPO d, 1989). Developing countries and the majority of developed countries, in particular the EEC, found a common ground to establish acceptable international standards on the issue. Japan and the United States voted against the text finally approved[21]. As discussed below, the issue of non-voluntary licenses and the treatment of industrial articles that contain infringing chips were the main points of disagreement for the two countries that, paradoxically, control around 90% of world production and trade of semiconductors.

Notwithstanding the relatively well-defined scope of the discussions, many delegations strongly felt that the decisions taken at the Conference would transcend the field of integrated circuits. For instance, it was believed that the treatment afforded to the issue of the non-voluntary licenses could affect the negotiations on the revision of the Paris Convention and other discussions within GATT[22]. Likewise, the provisions on disclosure and settlement of disputes could be relevant for other areas. Moreoveor, the Treaty was an important test for the ability of WIPO to manage international negotiations vis-a-vis GATT.

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20 Hereinafter referred to as "the Treaty". The text of the Treaty is included in the Annex.

21 Five countries (Sweden, Canada, New Zealand, Vatican and Lichtenstein) abstained.

22 According to some observers, the eventual impact of the wording of article 6.3 on other sectors, and particularly on pharmaceuticals, affected the final position of the U.S. delegation on the Treaty.

The following paragraphs contain a brief analysis of the discussion and of the approved text of the main provisions of the Treaty.

a) Definitions.

The discussions on definitions concentrated on two substantial issues (the concept of "integrated circuit" and of "lay-out design/topography"), and on the question of defining an "International Organization" with the effect of becoming a Contracting Party to the Treaty.

Unlike the WIPO Secretariat's draft, the Conference opted for defining "integrated circuit" instead of "microchip". The definition makes it clear that it covers "a product in its final form or an intermediate form", a clarification deemed essential by the United States[23] and other Group B delegations. The basic point behind this amendment to the draft relates to the protection of "gate arrays" and other integrated circuits (e.g. Programmable Logic Devices-PLDs) which cannot be considered "finished" products. The replacement of the phrase "capable of performing a function" by "intended to perform..." addressed also the problem of such intermediate products.

Another important discussion took place in connection with the applicability of the Treaty to integrated circuits containing only one active element. While some proposals made could have been interpreted as allowing the protection of "discreet" components -which was unacceptable for developing countries-, the compromise solution clearly indicates that such components are not covered by the Treaty.

As regards the definition of "lay-out design (topography)" [24], the approved text avoids implication regarding the requirement of fixation as a condition for protection. Moreover, it is clear that the three-dimensional disposition of the elements may be in any form ("however expressed"). U.S. and Japanese law include the actual fixation of the lay-out into a microchip among the conditions to be met to obtain protection. Some developing countries at the Conference held the view that it was convenient to retain such a requirement in the text, in order to avoid protection to merely theoretical designs. Developed countries -particularly Australia, Norway, the EEC- and a number of developing countries argued, in contrast, that the protection of unincorporated designs would be of benefit to countries that may have design capabilities but not those necessary to manufacture the chips. The solution adopted followed this second approach though, as far as developing countries are concerned, the practical validity of the argument is doubtful. Till now, in effect, those countries have produced

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23 The issue of protection of intermediate forms is still unclear in the United States. Though the Semiconductor Industry Association, for instance, maintains the protectability of "cell libraries" and "standard cells" they are not deemed eligible by the Copyright Office (Laurie, 1988, p. 25)

24 The use of this combined expression, agreed upon during the preparatory work for the Conference, avoided complex discussions on the most appropriate terminology to be applied in this field.

very few integrated circuits designs which have become internationally traded, and there is no reason to expect the development of a special comparative advantage in that field in the near future. Almost all the discussion of the draft treaty was based on the problems of the semiconductor industry. Those concerning independent "design houses" only emerged explicitly at the Conference itself. The role of such houses and the extent to which the protection devised may be necessary for their activities, would require further investigation.

The issue of the "Intergovernmental Organization" was brought up by the EEC desire to become a party to the Treaty independently from its member States. Having approved common rules on the matter (EEC Directive of December 1986), the member States have transferred to the Community the competence to be, as such, a party to an international convention on the matter (WIPO e, 1989). The approved text admitted that possibility.

b) Subject matter

The Treaty provision on the subject matter of protection does not differ substantially from the one discussed during the preparatory work. It spells out in para 3.1.a the basic obligation under the Treaty i.e., to secure intellectual protection in respect of lay-out designs, but leaves to each country the freedom to choose the measures to ensure the prevention of the acts considered illegal under article 6.

Para 3.2.a determines the requirements for protection of a lay-out design by combining the concept of "originality" and that of "intellectual effort" (employed in the U.S. and in the EEC regulations, respectively). It also adds as a qualification the condition -expressly provided for in the U.S and in the U.K legislation- that the lay-out should not be "commonplace among creators of lay-out designs (topographies) and manufacturers of integrated circuits at the time of their creation"[25].

Article 6.2.b of the Treaty (approved by the Conference upon a proposal, of the Soviet Union, later on modified) clarifies the extent of the title-holder rights in respect of another lay-out design which is identical. It makes it clear that those rights cannot be exercised against a third party if such a design has been independently created. A fortiori, the same rule would apply if the result is not an identical but a similar or substantially similar design independently developed.

The provision contained in 6.2.b. -though technically superfluous- is a strong indication of the radical difference existing between the rights conferred under the Treaty and the protection granted under patent law and other titles of industrial property. Those rights do not confer exclusivity neither on the functionalities of the design nor on a specific expression thereof. They only protect, in essence, against copying; more precisely, the protection is only against slavish copying and not against that based on an own "intellectual effort" (see point e below).

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25 Article 3.2.b of the Treaty specifies, however, that "a layout-design (topography) that consists of a combination of elements and interconnections that are commonplace shall be protected only if the combination, taken as a whole, fulfils the conditions referred to in subparagraph (a)"

Article 3 contains two paragraphs which did not appear in the draft text. On the one hand, it states that "the right of the holder of the right in respect of an integrated circuit applies whether or not the integrated circuit is incorporated in an article". This insertion -proposed by the Group of 77 during the final negotiations- was a compromise offered in order to avoid an explicit reference in article 6 to industrial articles that incorporate infringing microchips[26]. Many developing countries, as mentioned before, considered it unreasonable to treat on the same footing the cases of sale, importation and other forms of distribution of pirated chips and those where the latter are incorporated in industrial articles. While accepting the principle that the right of the title-holder does not terminate with the incorporation of a chip in an article, those countries did not want to accept that the title-holder would have exactly the same legal actions in those two different situations. In effect, it may be extremely difficult to determine whether chips imported or incorporated in imported products are infringing or not, especially if -as discussed in the framework of GATT negotiations- custom authorities are obliged to adopt measures at the border. If the title holder of the rights relating to a chip is, for instance, authorised to stop the importation of industrial articles because they may include an infringing chip (independently of its relevance both in terms of cost and function in the product)[27] trade flows could be significantly distorted.

On the other hand, article 3 incorporated a paragraph allowing any country to limit protection to semiconductor integrated circuits. The Treaty definitions do not specify the type of material in which the lay-out may be incorporated. Most laws in force (in U.S., Japan, EEC countries, Denmark, etc.)[28], however, specifically refer to "semiconductor products", a limitation that many countries would like to be free to apply.

c) The legal form of protection

Article 4 was adopted without significant discussion. It was introduced in the draft text at the request of developing countries during the preparations for the Conference, in order to allow different countries to apply existing intellectual property laws for chips protection. While exercising this freedom, however, the Contracting Parties are bound to comply with the obligations under the Treaty.

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26 Such a reference was eliminated from articles 6.1. and 6.4., as drafted by WIPO Secretariat. Article 6.5 of the draft ("articles temporarily or accidentally entering the territory of a Contracting Party"), which could also have implications on this problem, was also deleted.

27 In some cases (e.g. computers) chips may be an essential part of the product. In others, however, they may be incidental both functionally and as a proportion of total cost (e.g. a digital clock in a car)

28 One exception is the recently enacted Australian law on the matter which applies in general to "circuit layouts" without specifying any material.

Article 12, however, provides that the Treaty "shall not affect the obligations that any Contracting Party may have under the Paris Convention for the Protection of Industrial Property or the Berne Convention for the Protection of Literary and Artistic Works". According to the interpretation of the Director General of WIPO, the effect of that article is that "if a Contracting Party chose to implement its obligations under the Treaty through a law made, totally or partly, on the basis that layout-designs are works under the copyright law or are a subject matter of industrial property law, and that Contracting Party is a party not only to the proposed Treaty by also to the Berne Convention or the Paris Convention, the said law must be compatible not only with the proposed Treaty but also with that or those Conventions. For example, if a Contracting Party considered layout-designs to be works under its copyright law and was a party to both the proposed Treaty and the Berne Convention, layout-designs would have to be protected without formalities (even though the proposed Treaty admits formalities) and for 50 years after the death of the author (even though the proposed Treaty admits a shorter period of protection). Or, if the Contracting Party is party to both the proposed Treaty and the Paris Convention and protects layout-designs by patents for inventions or utility models, layout-designs would require the grant of a patent or other official certificate (even though the proposed Treaty admits protection without any procedure before a government authority)" (WIPO d, 1989, p. 66).

If the interpretation quoted in the precedent paragraph is correct, there will not be much advantage for a country which adheres to the Treaty to apply copyright law in this field. An almost natural option will be to establish a special regime for the protection of lay-out designs, in order to reasonably limit the term and other rights of the "creator". If a title of industrial property were to be applied, the trade-offs of the different possible solutions should be carefully weighed. Clearly, patents confer a much stronger right than the sui-generis régime. Unfair competition might be the sole institution under which some room for manoeuvre may be found. However, to the extent that any Contracting Party is obliged to comply with the Treaty's minimum standards, the final result may not be too different from the application of a sui generis approach.

In other words, the flexibility apparently created by article 4 is de facto limited by the need to comply with the Treaty's compulsory standards and by its article 12. In a final analysis, the best that a country adhering to the Treaty could probably do is to establish a law that deals with the specificities of integrated circuits protection.

d) National Treatment

As mentioned before, the SCPA contained a strict material reciprocity clause. It "often has been regarded as the most blatant and severe stroke ever led against the principle of international treatment by a developed nation" (Dreier, 1988, p. 9). In fact, most regulations enacted in order to respond to the U.S. law -including the EEC Directive- also incorporated that condition, with the noticeable exception of the Japanese law. As stated by Dreier in respect of the SCPA, "this had exactly been its purpose: to incite foreign nations to explicitly grant protection for semiconductor chips - and this irrespectively of the question, whether traditional laws were in fact inappropriate or not. In this respect, the legislative history contains sufficient material to believe that mere affirmative statements that protection would already be provided for by existing copyright laws would have just as few chances to be accepted as references made to unfair competition law. Consequently, in order not to have the products of their own nationals unprotected within the US and not to lose the US market, other chip-producing industrialized nations didn't have much choice but to comply with the SCPA's legal mechanism" (Dreier, 1988, p. 7).

Given the results of the reciprocity clause of the SCPA and the de facto considerable harmonisation of the legislation of developed countries on the matter[29], it was a logic step to expect a movement towards the establishment of an international treaty that set down the minimum standards of protection including a restoration of the national treatment principle. Article 5 of the Treaty precisely states that principle, the application of which is in any case subject to the compliance of the obligations under the Treaty. The approved text introduces some amendments to the draft treaty, which was based on the Paris Convention wording. It refers specifically to a real and effective establishment for the "creation" of lay-out designs or for the "production" of integrated circuits. This text implicitly reflects the exclusion of the "fixation" criterion as well as of a mere "commercial" establishment as a basis to benefit from national treatment.

e) Scope of protection

i) Acts requiring the authorization of the title-holder

Article 6 may be regarded as the core of the Treaty, for it establishes the content and limitations of the title-holder rights and, therefore, the extent of the minimum standards of protection to be respected by the Contracting Parties.

Article 6.1 enumerates -in a non-taxative way- the acts that require the title-holder authorization. On the one side, since non-fixed lay-out designs are eligible for protection, the reproduction "by incorporation in an integrated circuit or otherwise" will be unlawful if made without authorization (except for non-original parts of the design). This provision, as drafted, comprises the total or partial reproduction of the lay-out design on a mask, on a computer tape, on paper, or by any other means including the manufacture of a microchip (WIPO d, 1989, p. 30).

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29 Such an harmonisation has been, however, partial in many respects. The EEC Directive, for instance, gave the member States the option to choose between copyright or a specific protection, or a cumulation of both (see Cohen Jehoram, 1987, p.38)

On the other, the Treaty specifies the unlawfulness of the acts of "importing, selling or otherwise distributing for commercial purposes a protected layout-design (topography) or an integrated circuit in which a protected layout-design (topography) is incorporated" if made without authorization. All references to the unlawfulness of the same acts when performed in respect of industrial articles that contain infringing integrated circuits were omitted. As indicated above (see point b of this section), such an omission was a critical part of a broader negotiating compromise. In fact, as noted by some delegates of developing countries, the majority of regulations on the matter (with the clear exception of those of United States and Japan) do not explicitly mention industrial articles. Many delegates of developing countries thought that the solution adopted in the Treaty will leave national legislative and judicial authorities more flexibility to determine the concrete measures applicable in each case.

ii) Reverse engineering

Although no explicit mention is made in the Treaty, it clearly contains the exception of reverse engineering, which has been common practice in the semiconductors industry. It is also formally recognised -although with some differences- by national laws enacted until now on the matter. The pertinent provision -article 6.2.a- is, like the totality of article 6, self-executing, i.e. no special provision at the national level would be required in order to give it full effect. Said provision, on the other hand, not only authorizes reverse engineering, which has an industrial aim, but other acts made for "private purposes" or for the "sole" purpose of research or teaching. This means that the reproduction of a lay-out design, for instance, at a university laboratory for purposes of training, is to be deemed legal.

Provision 6.2.b. clarifies the extent of the reverse engineering exception. It states that as long as there is an intellectual effort involved (which is necessary to comply with the originality requirement) the rights of the title- holder of the reverse engineered design cannot be used against the creator of the second design.

The Treaty should be interpreted in the sense that it permits the copying of original parts of a first lay-out design into a second one, as long as the latter is also original. As mentioned before (see point b above), only "slavish" copying is illegal, but not that based on an intellectual effort.

iii) Non-voluntary licenses

Determinant in the refusal by United States and Japan of the final text of the Treaty, and considered critical by developing countries, the provision on non-voluntary licenses was one of the most difficult issues dealt with by the Conference. The approved text was the result of intense negotiations around the basic draft prepared by WIPO Secretariat

prepared by the WIPO Secretariat and new proposals submitted by the EEC and the United States[30].

The adopted provision constitutes an important departure from the original position of the Group of 77. However, its basic concept -the possibility of granting a non-voluntary license "to safeguard a national purpose deemed to be vital" by the national authority -satisfied to a considerable extent the Group's expectations. On the other hand, the text reflects a number of conditions derived from various proposals of developed countries, which set out the framework in which such licenses can be granted. Those conditions are a) the "non-ordinary" character of the circumstances to be taken into account; and b) the existence of previous "unsuccessful efforts" made "in line with normal commercial practices"[31].

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30 The Group of 77 unanimously supported, during the negotiations, alternative A of the WIPO Secretariat's draft on article 6.3.a.1 with a clear and unqualified reference to "public interest" as a premises to grant such licenses. The United States proposal based on the text submitted by that country in GATT for standards on patents, limited the applicability of compulsory licenses "to address, only during its existence, a declared national health or public safety emergency, or to remedy an adjudicated violation of antitrust or other law designed to secure fair competition and to prevent abuses of dominant market position, or to allow use exclusively for governmental purposes". The EEC proposal read as follows: "(a) Notwithstanding paragraph (1), any Contracting Party may, in its legislation, provide for the possibility of its executive or judicial authority granting a non-exclusive license for the performance of any of the acts referred to in paragraph (1) by a third party without the authorization of the holder of the right after serious and unsuccessful efforts to obtain such authorization ("non-voluntary license") where the granting of non-voluntary license if found, by the granting authority, to be necessary for the safeguard of a vital public interest, i.e. defense or public health; the non-voluntary license shall be subject to the payment of an equitable remuneration by the third party to the holder of the right, which remuneration shall, in the absence of agreement between the third party and the holder of the right, be fixed by the granting authority. (b) The granting authority of any non-voluntary license, and fixing of equitable remuneration, referred to in subparagraph (a) shall be subject to judicial review. Any such license shall be revoked when the facts that justify it cease to exist. (c) A non-voluntary license granted under this paragraph shall not be assignable. (2) Further declaratory note on Article 6 (3): For the purposes of the application of Article 6 (6)," a non-voluntary license cannot be regarded as replacing the consent of the holder of the right". The text added that the following declaratory note should be inserted in the records of the Conference as note to para. (a): "The provisions of this Treaty are without prejudice to any measures taken under the legislation of the Contracting Parties intended to secure free competition".

31 The reference to "normal commercial practices" was negotiated against the deletion - sought by developing countries - of a criterion according to which the remuneration for the license should be commensurate with the "market value" of the license.

Further, article 6.3 determines the terms whereunder a non-voluntary license can be granted. It must be a) non-exclusive; b) available only for the domestic market[32]; c) subject to the payment of "an equitable remuneration"; d) subject to judicial review; and e) revokable when the conditions that justified its granting have ceased to exist. These terms are considerably more restrictive than those authorized by the Paris Convention, and in particular than those proposed for its revision by developing countries. Under such Convention, in particular, there is no restriction relating the market and the license may last for the lifetime of the title. In exchange, the Paris Convention does not refer to the broad concept of "national purpose".

In addition, article 6.3.b. recognises the right of any country " to apply measures, including the granting, after a formal proceeding by its executive or judicial authority, of a non-voluntary license, in application of its laws in order to secure free competition and to prevent abuses by the holder of the right"[33]. The drafting of this provision may allow two ways of interpretation. It may be construed, on the one hand, as permitting the control of abuses only to avoid distortions to "free competition". A second valid interpretation is that the regulations for the control of abuses need not be necessarily aimed at dealing with competition problems. In fact, many abuses may stem from situations where competition is not affected[34].

It is doubtful to what extent the provision on non-voluntary licenses of the Treaty may affect future negotiations on other areas of intellectual property. The Group of 77 may claim a relative success, due to the recognition of the notion of "national purpose" and the possibility to act against "abuses". Group B, on its part, obtained the insertion of a number of limitations that innovate in the field of compulsory licenses. Of course the nature of the right ensured under the Treaty substantially differs from those granted under industrial property rights and, in particular, in the patents field, where a stronger monopoly is conferred. A likely conclusion for many developing countries is that the type of provision reached in the Treaty -for a title which does not prevent more than copying- should a fortiori apply to stronger titles. Of course, if the text of article 6.3 is taken into account, a substantial trade-off will exist with regard to the conditions to be met for granting a license.

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32 With this restriction developed countries wanted to exclude the use of the license to make exports, particularly to countries where the lay-out designs are not protected. The possibility of making such a use, in the field of patents, is recognised by some legislations, e.g. in Mexico.

33 The adopted text avoided the implication contained in the Group B proposal in the sense that the license could only be granted on the basis of existing antitrust legislations. The Group of 77 argued that such a legislation does not exist in many countries, and that other measures to avoid abuses should be equally applicable.

34 A still unresolved debate on the tests to judge abuses in business practices took place during the negotiations of an international Code of Conduct on Transfer of Technology. The Group of 77 upheld the applicability of a "development test" significantly broader than the test based on competition rules. See Correa, 1988, p. 10.

iv) Innocent infringement

Another important issue of discussion at the Conference concerned the content of the provision on "innocent infringement". The controversial point was the inclusion or not of a reference to the payment that the innocent infringer should make after knowing that he was dealing with unlawfully copied microchips[35]. The adopted text limits itself to establishing -as a mandatory provision for all Contracting States- the exception in favour of such an infringer. Developing countries' main concerns related to the implications of the payment provision for the acquirer of articles incorporating infringing microchips (finally eliminated from article 6, as mentioned before) and to the treatment of the products held in stock by the innocent acquirer.

Being silent on the payment issue, article 6.4 wisely leaves the question of the consequences of the infringement to national laws.

v) Exhaustion of rights

Article 6.5 introduces the well-known exception of "exhaustion of rights", as a facultative provision for Contracting States. Its main aim is to ensure that after the first sale of a microchip is made, by the title-holder or with his consent, he can not prevent "parallel imports" of the products already put in the market. As explained in the notes to the draft treaty, "it follows from the drafting of the provision in paragraph (6) that Contracting Parties would be free to provide for national exhaustion (where rights are exhausted only when the first authorized sale occurs on the territory of the Contracting Party), regional exhaustion (where rights are exhausted when the first authorized sale occurs on the territory of a region to which the Contracting Party belongs), or international exhaustion (where rights are exhausted following a sale anywhere in the world)" (WIPO d, 1989, p. 6).

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35 The draft text proposed a clause supported originally by the Group B according to which the innocent infringer "shall be obliged to pay the holder of the right an equitable remuneration in respect of each microchip imported, sold or otherwise distributed, as part of some other article or separately, for commercial purposes, after actual notice has been given to the said person by the holder of the right that the reproducing or incorporation had been done without his authorization, the amount of such remuneration to be fixed, failing agreement between the parties, by a court or an other impartial authority designated by legislation" (WIPO d, 1989)

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Article 6.5 introduces the well-known exception of "exhaustion of rights", as a facultative provision for Contracting States. Its main aim is to ensure that after the first sale of a microchip is made, by the title-holder or with his consent, he can not prevent "parallel imports" of the products already put in the market. As explained in the notes to the draft treaty, "it follows from the drafting of the provision in paragraph (6) that Contracting Parties would be free to provide for national exhaustion (where rights are exhausted only when the first authorized sale occurs on the territory of the Contracting Party), regional exhaustion (where rights are exhausted when the first authorized sale occurs on the territory of a region to which the Contracting Party belongs), or international exhaustion (where rights are exhausted following a sale anywhere in the world)" (WIPO d, 1989, p. 6).

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35 The draft text proposed a clause supported originally by the Group B according to which the innocent infringer "shall be obliged to pay the holder of the right an equitable remuneration in respect of each microchip imported, sold or otherwise distributed, as part of some other article or separately, for commercial purposes, after actual notice has been given to the said person by the holder of the right that the reproducing or incorporation had been done without his authorization, the amount of such remuneration to be fixed, failing agreement between the parties, by a court or an other impartial authority designated by legislation" (WIPO d, 1989)

g) Exploitation, registration and disclosure

Like most national laws on the matter, the Treaty spells out in article 7.1 some conditions on which protection may be made conditional. Since the protection of unfixed lay-out designs prevailed at the Conference, that provision gives the freedom to grant protection from the time of the creation of the design (as under the United Kingdom regulations), to subject it to "commercial exploitation" (like most laws in force do) or even to registration (like in the United States to institute civil actions, in Japan and other countries). This article may, thus, allow different existing laws to maintain their present solutions and new regulations to adopt any of the referred bases for protection. They could even opt, for instance, to require commercialization plus registration within a certain period of the latter, as in United States and Japan, in order to confer or to maintain protection.

Article 7.1 refers to "ordinarily" commercially exploited lay-out designs. Such a qualification emerged as a compromise vis-a-vis the proposal of developing countries to refer to "public" exploitation. That proposal was intended to exclude situations in which a lay-out design may be commercialized under confidential terms, without being apparent to the consumer public and to competitors. In fact, that concern has been addressed by many regulations and, in particular, by the EEC Directive and West European laws on the matter[36].

A point of particular importance for many delegations related to the extent of disclosure to be required under the Treaty, on the understanding that its provision on the matter will be the maximum a national law could demand. For developing countries, the discussion on this issue was viewed as transcending the integrated circuits field, to the extent that it could create a precedent for other areas. In particular, it was feared that through the Treaty a multilateral system for trade-secrets protection could be established.

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36 According to the EEC Directive, for instance, "commercial exploitation shall not include exploitation under conditions of confidentiality to the extent that no further distribution to third parties occurs, except where exploitation takes place under conditions of confidentiality required by a measure taken in conformity with Article 223 (1) (b) of the Treaty". The UK regulation of 1987 provides, along these same lines, that "no account shall be taken of any commercial exploitation which is subject to an obligation of confidence in respect of information about the topography exploited unless either-
(a) the topography has been commercially exploited on a previous occasion (whether or not subject to an obligation of confidence), or
(b) the obligation is imposed at the behest of the Crown, or of the government of any country outside the United Kingdom, for the protection of security in connection with the production of arms, munitions or war material".

Between the desire of some developing countries to include a reference to the "electrical schematic diagrams" of the chips, and that of developed countries of being able to exempt the title-holder from presentation of any confidential material, the adopted solution represents a fair compromise. On the one hand, the applicant may be required (though not necessarily, given the non-mandatory nature of this provision) to describe the "electronic function that the integrated circuit is intended to perform". On the other, he is not obliged to submit information relating to the "manner of manufacture" of the integrated circuit, provided that the information supplied is sufficient for the identification of the lay-out design.

At the moment, there does not seem to exist great harmonisation on this matter among developed countries (in some of them, such as Sweden and the United Kingdom, moreover, no registration is required). The Treaty will not certainly contribute very much to that harmonisation, given the range of options at hand for national authorities to deal with registration procedures.

Article 7.2.b contains a limitation for those countries that at the same time require commercial exploitation and registration to grant protection. The latter cannot be imposed before two years from the date of first commercialization anywhere in the world. This minimum period was necessary, according to some developed countries' delegations, for the title-holder to prepare the information to be supplied or to present the samples of the microchips. That term may be, however, significantly longer than really needed for that purpose in view, in particular, of the speed with which developments take place in the semiconductors field (a few months may be crucial for success or failure in that market). In any case, to the extent that the duration of protection could be counted from the creation of a lay-out design (see following point) or from the date of first commercial exploitation, the implications of the said rule on the term of protection can be reduced.

h) Duration of the protection

The Conference overcame complex discussions on the term of protection, by virtue of a finally accepted, informal proposal of the WIPO Director General, which very simply states that "protection shall last at least eight years". While many countries held that five years were sufficient, others wanted longer terms. In practice, ten years was the standard set out by the SCPA for the regulations adopted in other developed countries. The Treaty, on the one hand, allows for a lower minimum. On the other hand, it is silent about the date from which the term is to be counted. This again leaves freedom to apply different solutions, such as from first commercial exploitation, application for registration or registration. One open question is whether a country could decide to count that term since the creation of the lay-out design, however determined. Nothing in the Treaty seems to exclude such possibility. In fact, some laws recognise protection from the creation date[37].

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37 See, for example, art. 5.b of UK regulations of 1987.

i) Settlement of disputes

Article 14 of the Treaty introduces an important innovation in the area of international conventions on intellectual property. Notwithstanding a general initial reluctance of the Group of 77, the Conference was able to get an agreement on the basis of a revised version of the proposal contained in the draft text (which was based on a draft submitted by the United States at the fourth session of the Committee of Experts). Unlike the Paris and Berne Conventions, which only provide for the right to resort to the International Court of Justice in order to solve interpretation or enforcement disputes, the Treaty sets out procedures for consultations, failing which a panel may be constituted in order to analyse the facts and make recommendations. On that basis, the Assembly created by the Treaty (which shall meet in ordinary session once every two years) shall, "by consensus, make recommendations to the parties to the dispute, based upon its interpretation of this Treaty and the report of the panel" (article 14.4).

The texts considered by the Conference resembled, with differences, the proposal for settlement of disputes adopted at the GATT Mid-Term Review Meeting of Montreal, in December 1988. They were certainly inspired by the GATT procedures. It was strongly felt by most delegations that notwithstanding the specific field under discussion, the text to be approved would have implications in other discussions of intellectual property within WIPO and elsewhere.

As compared to the draft proposal (which was only incorporated by WIPO as an "alternative"), the adopted text contains a number of improvements. First, it includes a new paragraph on "other means of settlement" such as good offices, conciliation, mediation and arbitration to which the parties may agree to resort. Second, the conditions for the setting up and functioning of the panel have been specified with more detail, including, in particular, the possibility for the parties to the dispute to agree on the terms of reference for the Panel's work. Third, the panel is to be convened by the Assembly (and not by the Director General of WIPO). Fourth, the Treaty requires the Assembly to adopt rules on the selection of panel members and for the panel proceedings. Fifth, article 14.3.c determines the procedures to be followed by the panel and the participation the parties to the dispute may have. Sixth, and most important, the outcome of the process does not include the possibility for the Assembly to authorize or apply sanctions to the Contracting Party deemed to have violated the Treaty, or to its nationals. Such a possibility was deemed unacceptable by many delegations, particularly from developing countries.

4. Implications of the Treaty

The adoption of the Treaty constitutes, no doubt, an important step in the process of internationalization of the sui generis approach first established by the United States. Paradoxically, for this country, the Conference is far from representing a success, as evidenced by its negative vote. In fact, the outcome of the negotiations contradicted most expectations. Developing countries expected a considerably unified Group B and, basically, a North-South confrontation on the main issues. Their ability to influence what seemed a relatively easy agreement among developed countries was deemed low. On the other hand, many delegations in Group B expected the Group of 77 either to block the negotiations or to maintain a purely defensive strategy. Both sides were wrong. Important differences emerged within the Group B, while the Group of 77 was active in looking for compromises that leave some freedom for national legislation and that soften the minimum standards to be applied.

If the actual productive and innovative capabilities are taken into account, one possible interpretation of the Conference results is that the countries that are mainly users, and not producers, of semiconductor chips were able to reach an agreement on terms unsuitable, however, for the major producers. The interest of the EEC to conclude the negotiations certainly cannot be explained by its desire to be accepted, as such, as a Contracting Party (in fact, the Community already is party to a number of conventions). Its endorsement of the adopted text, jointly with developing countries, seem to indicate, in reality, that major powers may face some obstacles at the time of promoting international standards for intellectual property.

An important question is what the attitude of the United States and Japan will be as regards the Treaty. If they do not accede to it, there will be a convention that leaves aside, as mentioned, nearly 90% of world production of chips. Given that -according to article 11.2.c- no proposal for the amendment of the Treaty can be made before the expiration of five years from the date of entry into force, an early revision of the Treaty cannot be expected. In addition, though the matter of integrated circuits was submitted by the United States and Japan for consideration in the Uruguay Round, there is no room at all for those countries to reopen the discussions on the issue within GATT.

Another important question is what the strategy of the United States vis-à-vis WIPO and GATT will be in the field of intellectual property. Certainly, any claim of failure of WIPO in its role of strengthening international protection of intellectual property would be unjustified. The organization has proved its ability to conciliate very different interests and, in particular, to involve a large number of developing countries in the design and establishment of international norms. Despite the fact that very few among such countries could have an actual interest in the area of semiconductors, a significant number of them have supported the text of the Treaty. Moreover, the "New Industrializing Countries" (NICs) have been among the most active during the whole process of negotiations.

From the perspective of developing countries, the Treaty represents a compromise (with certain flexibility in key provisions such as non-voluntary licenses), conditions for protection (including disclosure requirements) and legal consequences of the importation of articles incorporating infringing chips, with fairly balanced provisions on duration and settlement of disputes. For many of them, the adherence to the Treaty may be desirable not because of its eventual impact on local design activities, but in order to avoid unilateral actions by developed countries, such as those that could be implemented under section 301 of the U.S. Trade Act.

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